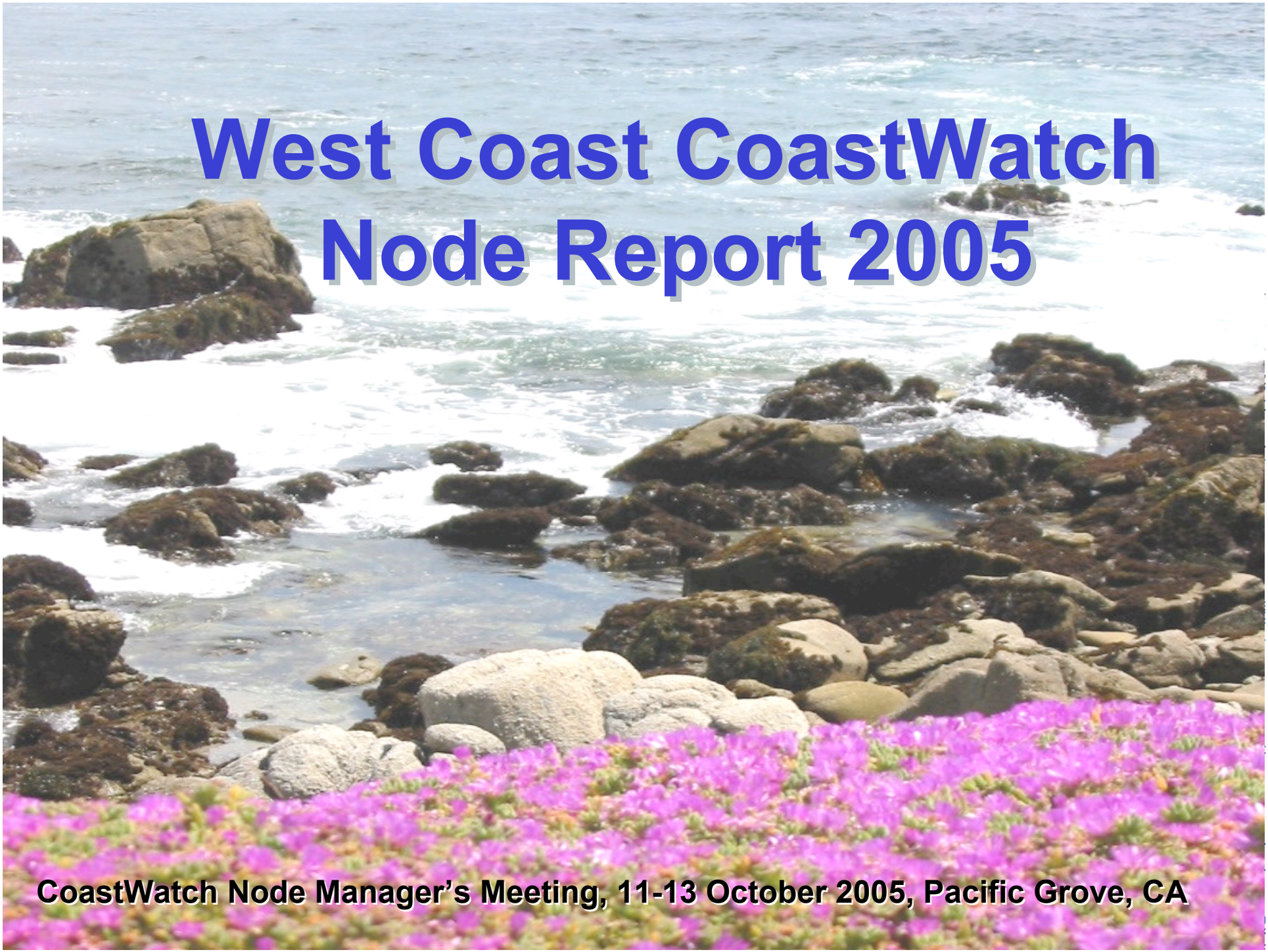


West Coast CoastWatch Node Report 2005

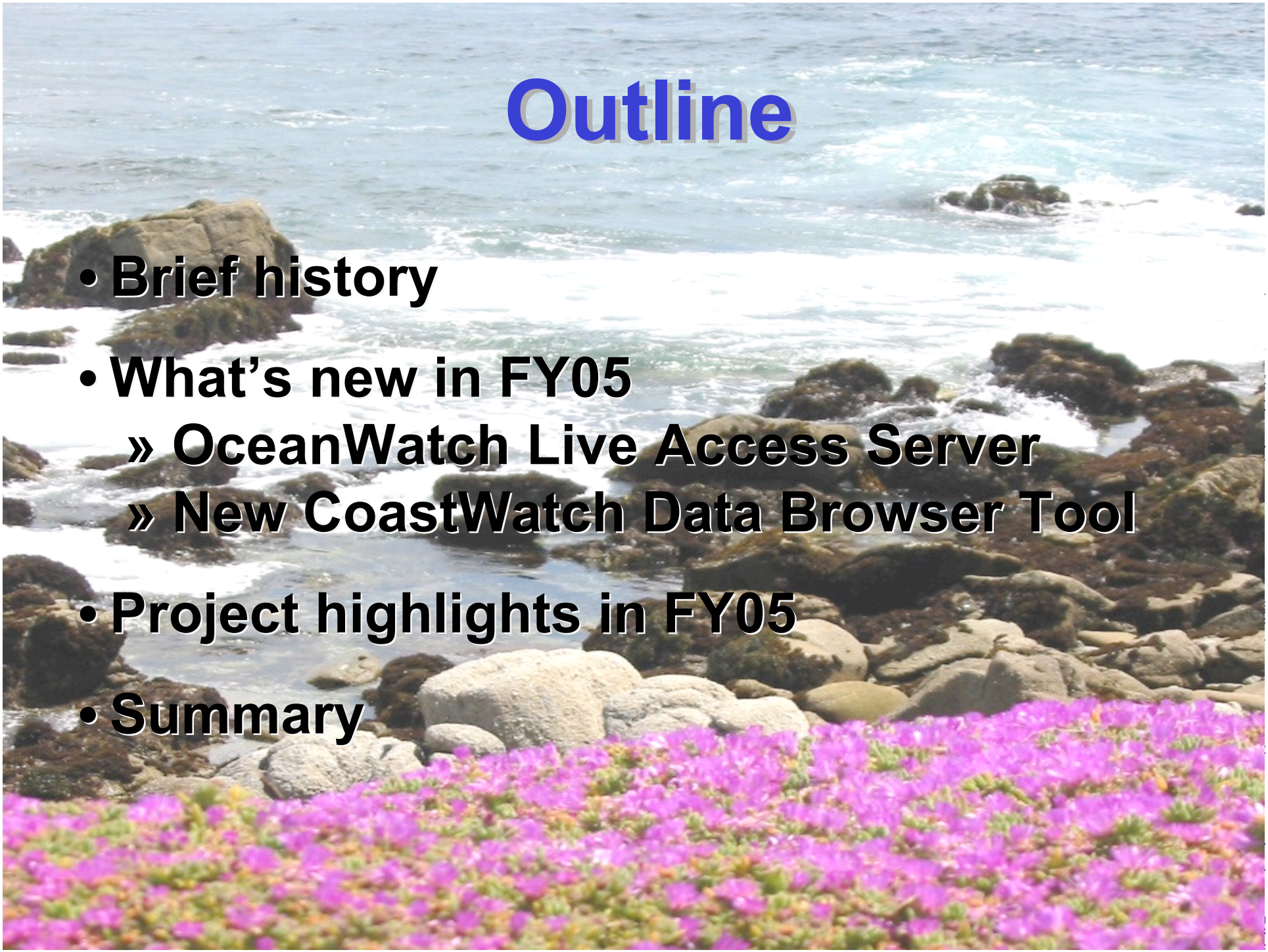
CoastWatch Node Manager's Meeting, 11-13 October 2005, Pacific Grove, CA

West Coast CoastWatch Node

Environmental Research Division
(formerly PFEL)
NOAA/NMFS/SWFSC
Pacific Grove, CA

Cara Wilson	Node Manager
Dave Foley	Node Coordinator
Luke Spence	Operations Officer
Bob Simons	Products Manager

Special thanks to Lynn DeWitt and Roy Mendelssohn at NOAA/NMFS/SWFSC/ERD

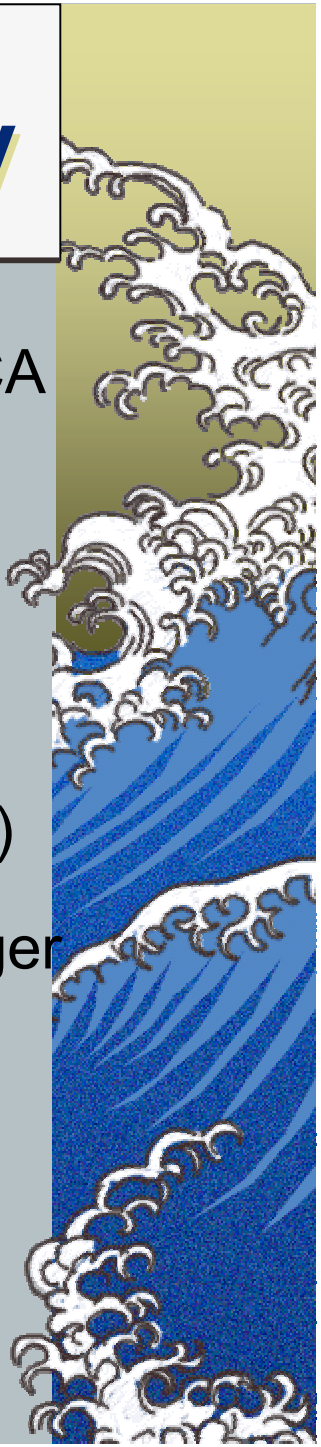


Outline

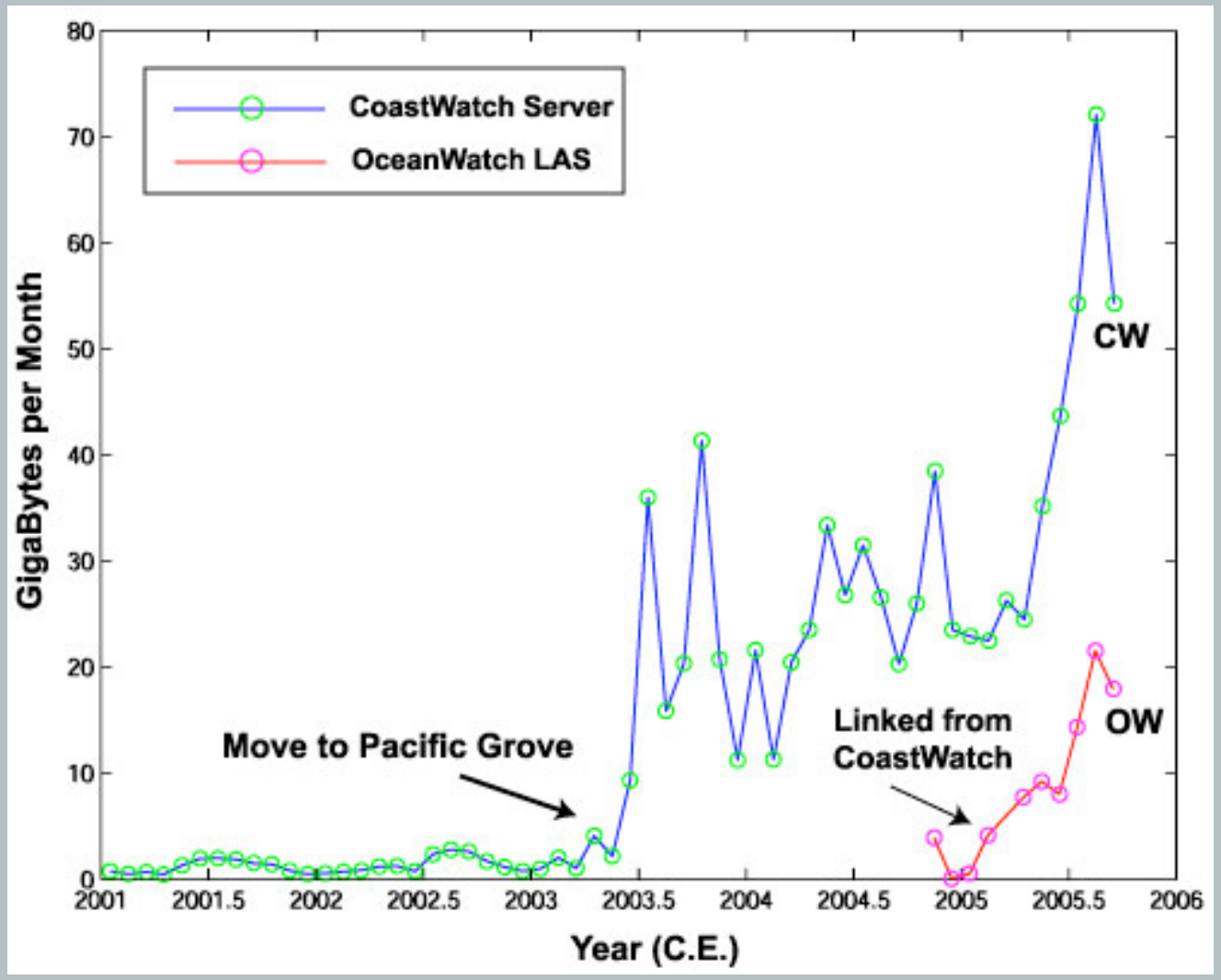
- Brief history
- What's new in FY05
  - » OceanWatch Live Access Server
  - » New CoastWatch Data Browser Tool
- Project highlights in FY05
- Summary

West Coast Regional Node History

1993	Started operating at NMFS/SWFSC in La Jolla, CA under Mike Laurs
1994	Ron Lynn becomes node manager, Rich Grosgvor node coordinator
Apr. ‘03	Moved to NMFS/SWFSC/PFEL (now ERD) Dave Foley (coordinator) & Mike Laurs (manager)
Jan. ‘05	Mike Laurs retires, Cara Wilson new node manager
Jan. ‘05	Bob Simons (Products Manager) and Luke Spence (Operations Officer) join the WCRN team



WCRN Data Access

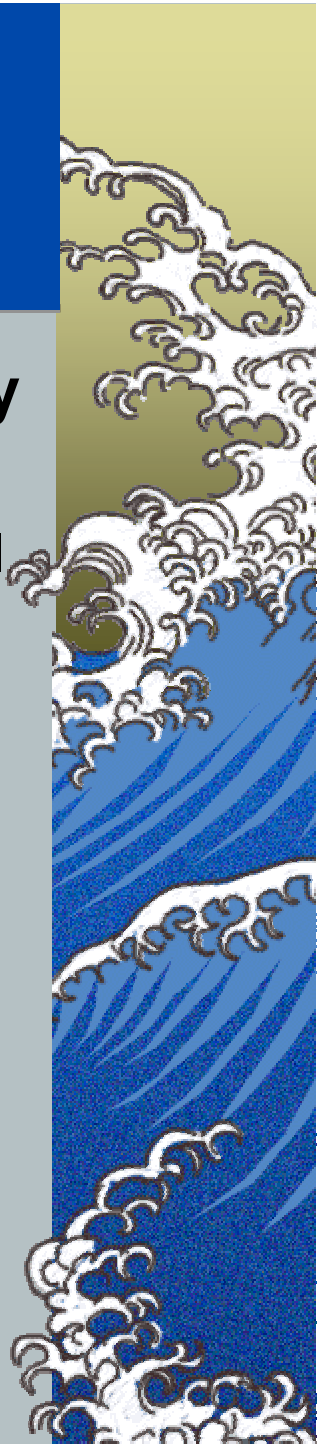


Live Access Server:

Ocean Watch

North Pacific Demonstration Project

Presented by:
Coastwatch and
Pacific Fisheries Environmental Laboratory



Near Real Time

SST

AVHRR, 11 km, global
AVHRR, 1.25 km, west coast
GOES, 5.5 km, West. Hemi.
MODIS, 5 km, global

Chlorophyll

SeaWiFS, 1.25 km, west coast
MODIS, 1.25 km, west coast
MODIS, 5 km, global

Winds

QuikSCAT, 0.25°, global

SSH

JASON, 0.25°, global

Delayed, Science Quality

SST

AVHRR Pathfinder, 0.1°, global
AVHRR POES, 0.1°, global

Chlorophyll

SeaWiFS, 0.1°, global
MODIS, 0.05°, global
OCTS, 0.1°, global

Winds

ERS-1&2, 1°, global
QuikSCAT, 0.5°, global

SSH

AVISO, 0.25°, global

Live Access Server (LAS)

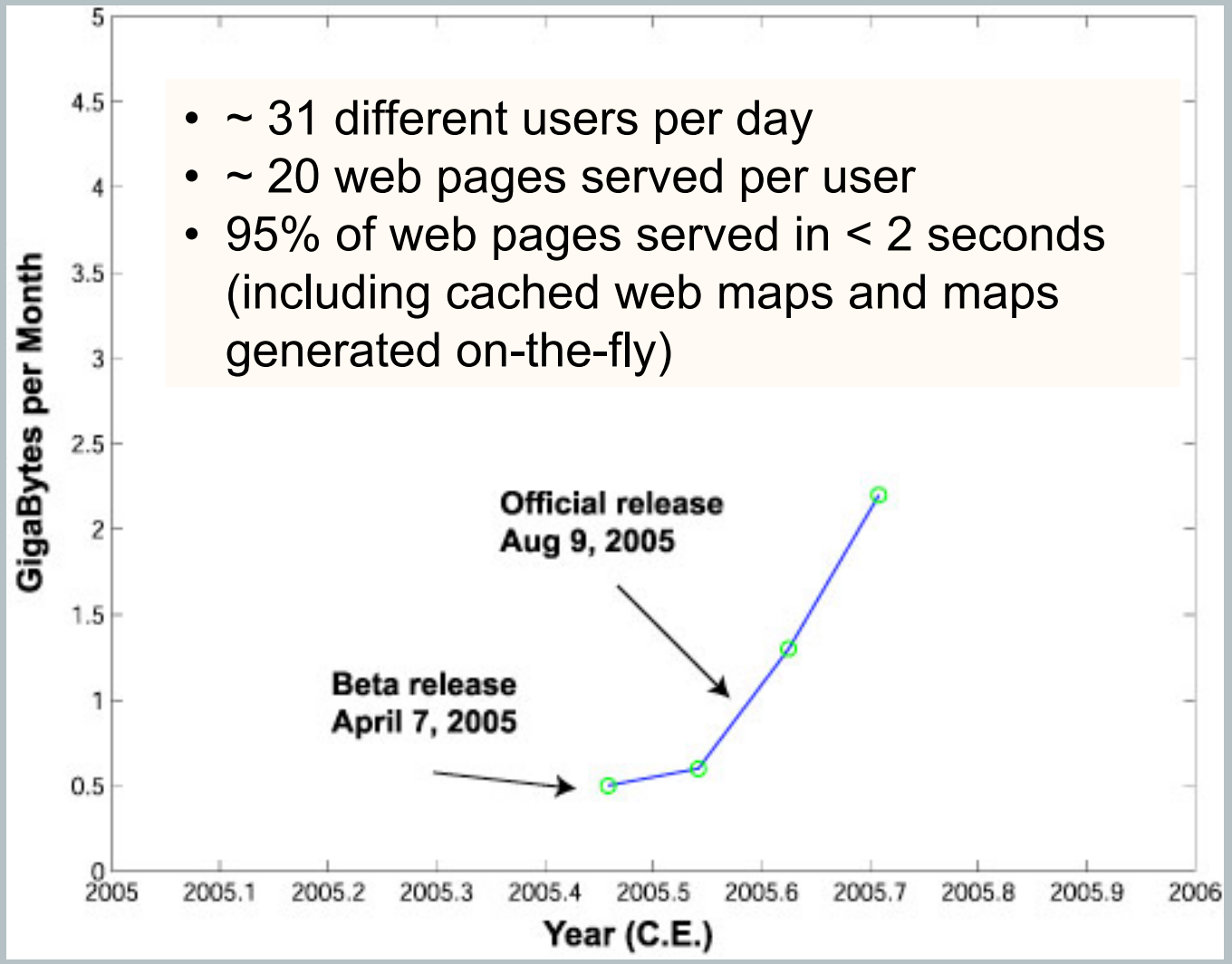
- Allows for one-stop data browsing
- Can transparently serve any data set on any other LAS
- Can transparently serve any data set that is OpenDAP/DODS enabled
- Can output digital data in a variety of formats
- Meets preliminary IOOS DMAC "suggestions"

http://las.pfeg.noaa.gov/OceanWatch.html

Special thanks to Lynn DeWitt and Roy Mendelssohn at NOAA/NMFS/SWFSC/ERD

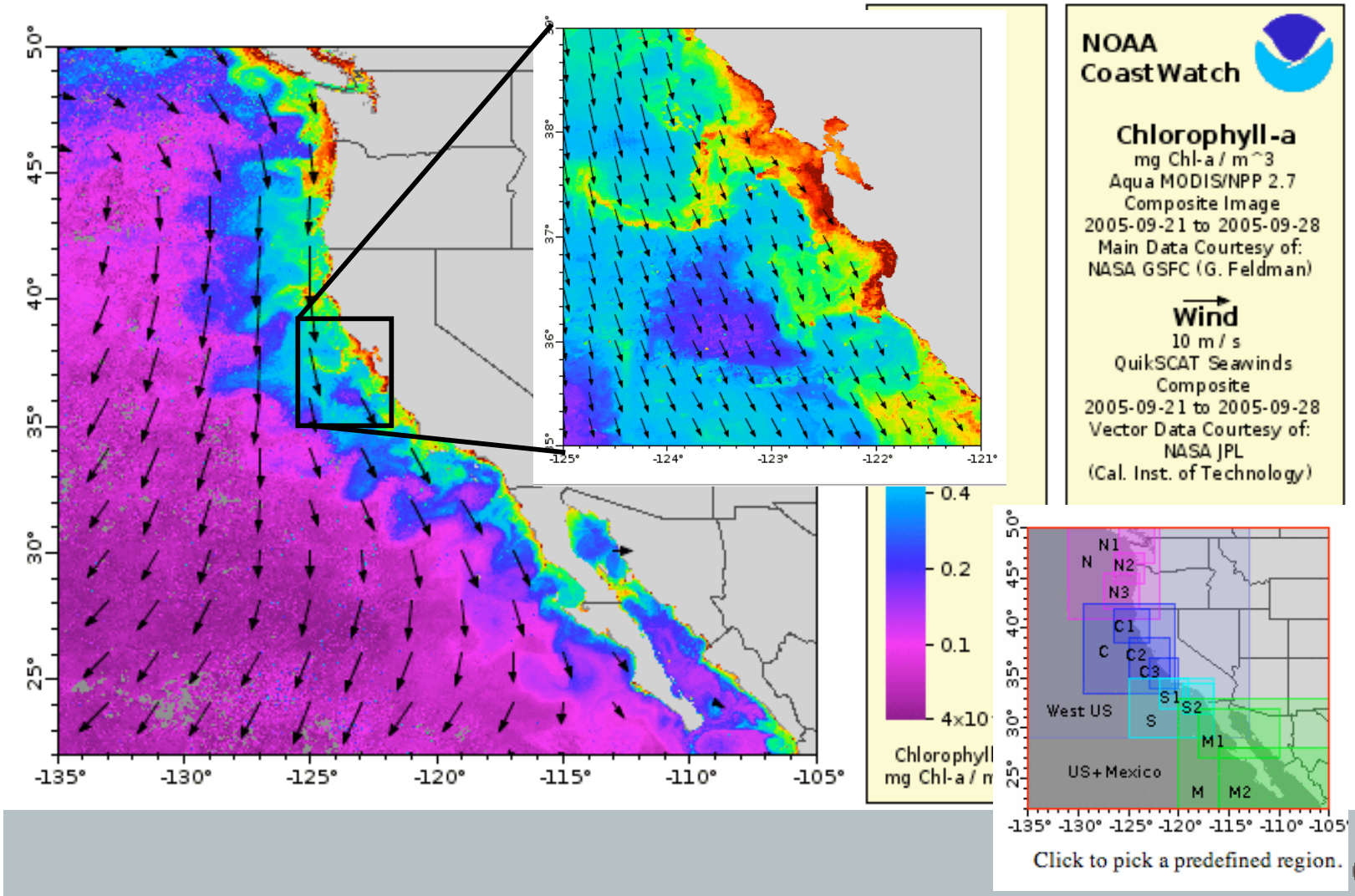
New CoastWatch Browser

- ~ 31 different users per day
- ~ 20 web pages served per user
- 95% of web pages served in < 2 seconds (including cached web maps and maps generated on-the-fly)



http://coastwatch.pfel.noaa.gov/coastwatch/CWBrowser.jsp

New CoastWatch Browser



http://coastwatch.pfel.noaa.gov/coastwatch/CWBrowser.jsp

New Browser - Datasets

1. SST, 1 km
2. **SST, 11 km**
3. **ΔSST**
4. Pathfinder SST
5. GOES SST
6. NASA Aqua Chl-*a*
7. OSU Aqua Chl-*a*
8. SeaWiFS Chl-*a*
9. **Zonal Wind**
10. **Merid Wind**
11. **Div Wind**
12. **Mod Wind**
13. **Zonal Wind Stress**
14. **Merid Wind Stress**
15. **Mod Wind Stress**
16. **Stress Curl**
17. **Ekman Upwelling**
18. **Zonal Ekman**
19. **Merid Ekman**
20. **Mod Ekman**
21. Front Probability

Bolded datasets are all available by OPeNDAP

New Browser - Options…

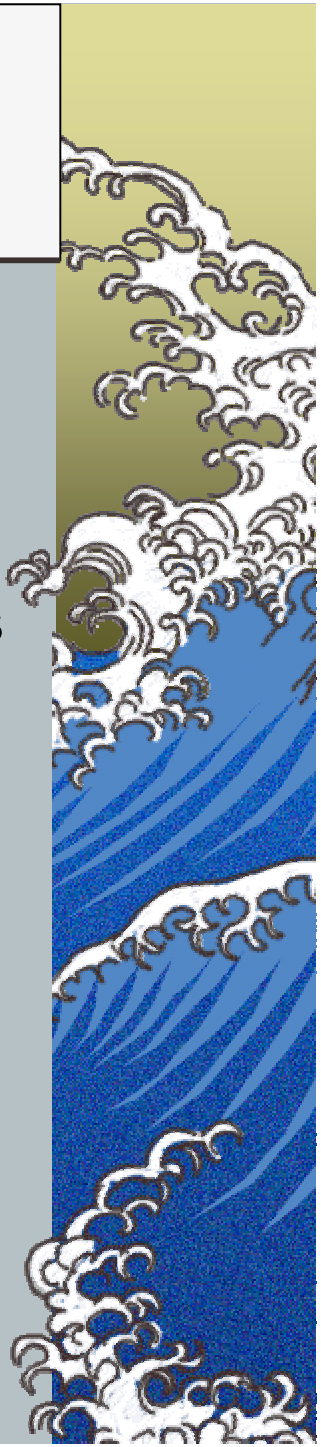
1. Multiple set map regions or user defined
2. Different units available:
   - Chlorophyll: kg/m^3 or mg/m^3?
   - Temperature: °C or °F?
   - Wind: m/sec or knots?
   - Upwelling: m/sec or m/day?
   - Divergence: sec^{-1} or 10^6 sec^{-1}?
3. Composite data: 1, 3, 8 or 14 days
4. Overlay bathymetry
5. Overlay vector data (wind or ekman current)
6. Change color palette (14 available)
7. Scale can be linear or log
8. Min/max range easily changed

New Browser - File Formats

1. •**.asc** - ESRI ASCII grid file (portable into GIS)
2. •**.grd** - GMT .grd file, also a valid NetCDF file
3. •**.hdf** - Hierarchical Data Format file, works with the CoastWatch Data Analysis Tool (CDAT)
4. •**.mat** - Matlab binary file
5. •**.nc** - NetCDF binary file, compliant with COARDS, CF-1.0, THREDDS ACDD and CWHDF metadata specifications
6. •**.xyz** - tab-separated ASCII file
7. **OPeNDAP** access for most datasets
8. **FGDC** - .xml file with FGDC metadata

New Browser - Summary

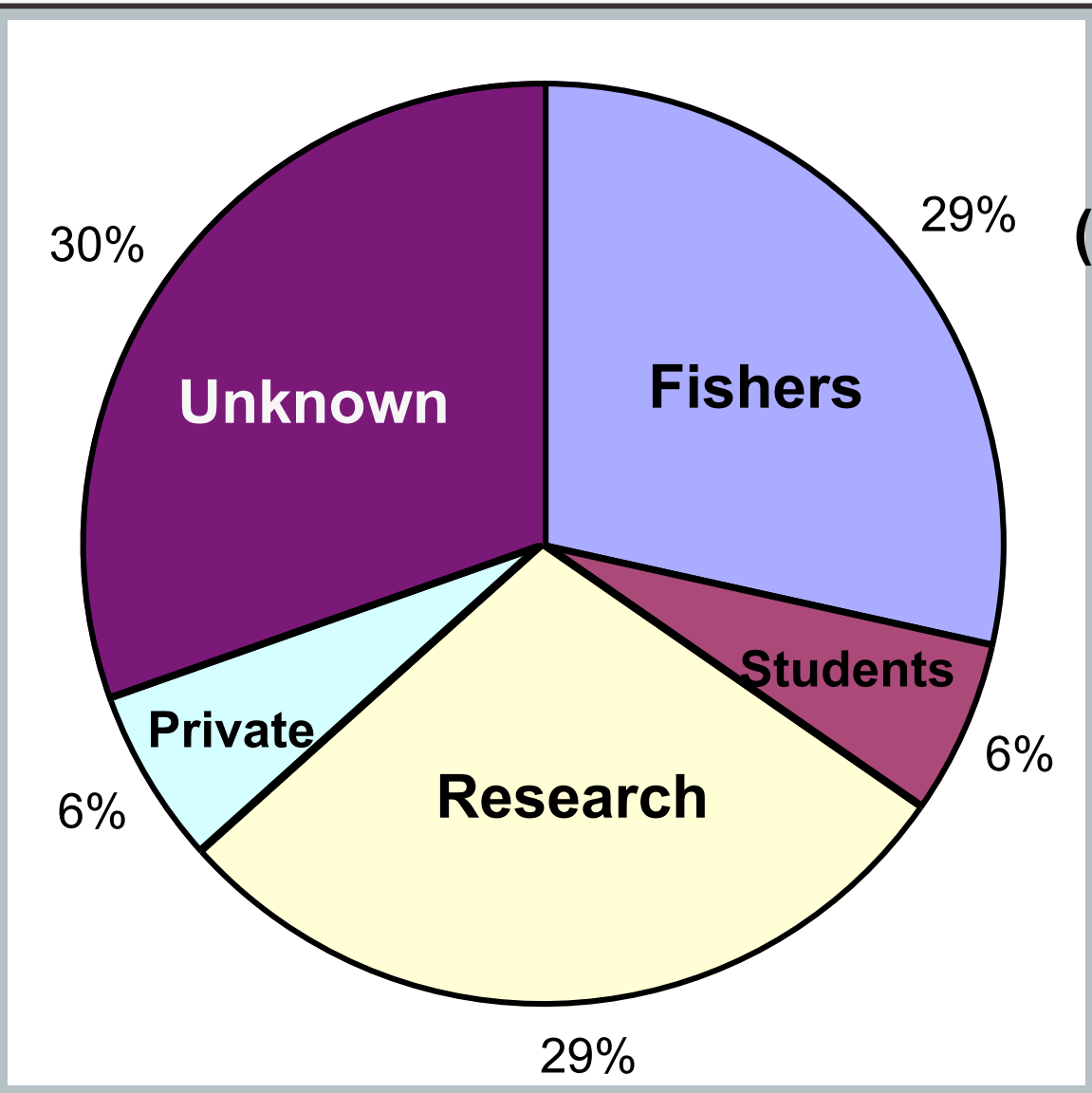
- Demonstrates the viability of accessing data from remote sites, notably via OPeNDAP servers
- Distributes data *in several formats*, not just pretty pictures
- User always presented with all, and only, the valid options
- Browser options contained on one page
- Good quality, instant feedback (a map) given about data
- Customizable maps
- Works on all browsers and all operating systems
- Was built relatively quickly by one person (many kudos to **Bob Simons**!), using only open-source software
- Provides metadata
- Is fast!



New Browser - Impacts

- Designed to accommodate emerging west coast regional association of IOOS
- Gulf of Maine Ocean Observing System (GoMOOS) has asked if they can have the code to implement this system for their region

WCRN Correspondance Statistics



Total: 49
(about 1/week)

Recent and Near-Future Additions

- **Primary productivity**
  Wilson, R2O
- **GOES frontal probability index**
  Mavor, CIOSS
- **Chlorophyll anomalies**
  Kudela (UCSC), Stumpf (NOAA/NOS)
- **Wind field anomalies (stress, curl etc…)**
  Chelton, CIOSS
- **Extended 1km SST**
  Strub, CIOSS

Some Project Highlights

- Ghostnet
- Marine Protected Areas (MPA)
- TOPP (Tagging of Pacific Pelagics)
- BloomWatch
- Cruise Support

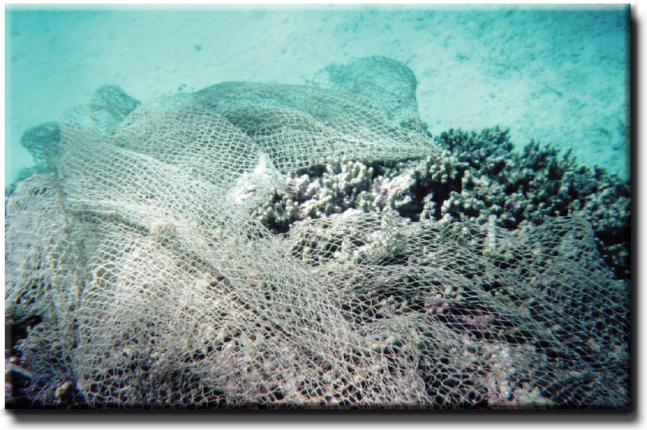
Ghostnet Program - Rationale

Minimize navigation hazards

Reduce wasteful “Ghost fishing”

Endangered Hawaiian Monk seal trapped in marine debris

Protect endangered species



Derelict fishing net anchored on coral

Maintain healthy coral reef ecosystems

Ghostnet Approach

Satellite data to identify convergence zones

- Infer with Ocean Color, SST, vector winds
- Observe with specially tasked SAR

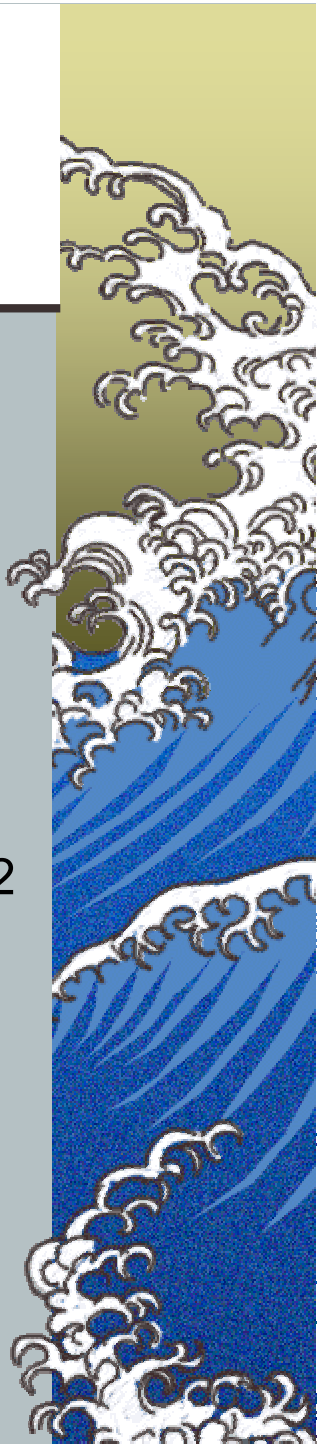
Aircraft to confirm presence of debris[1]

- Designating “hot spots”
- Deploy drifting buoys to track debris fields[2]

Interdiction with ships already on station[2]

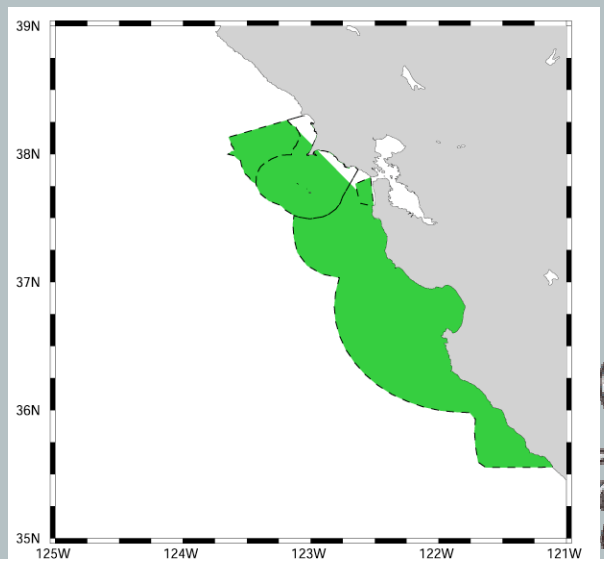
- Possible use of helicopter to optimize collection

[1]D. Foley and L. Spence from WCCW participated in these flights
[2]Planned for FY06



Using oceanographic data to define Marine Protected Areas

- NMFS/SWFSC/ERD
  F. Schwing, D. Foley, P. Stegmann, S. Bograd, D. Palacios, C. Wilson
- NOS/MBNMS
  H. Price, C. King, J. Pederson
- NPS
  J. Paduan

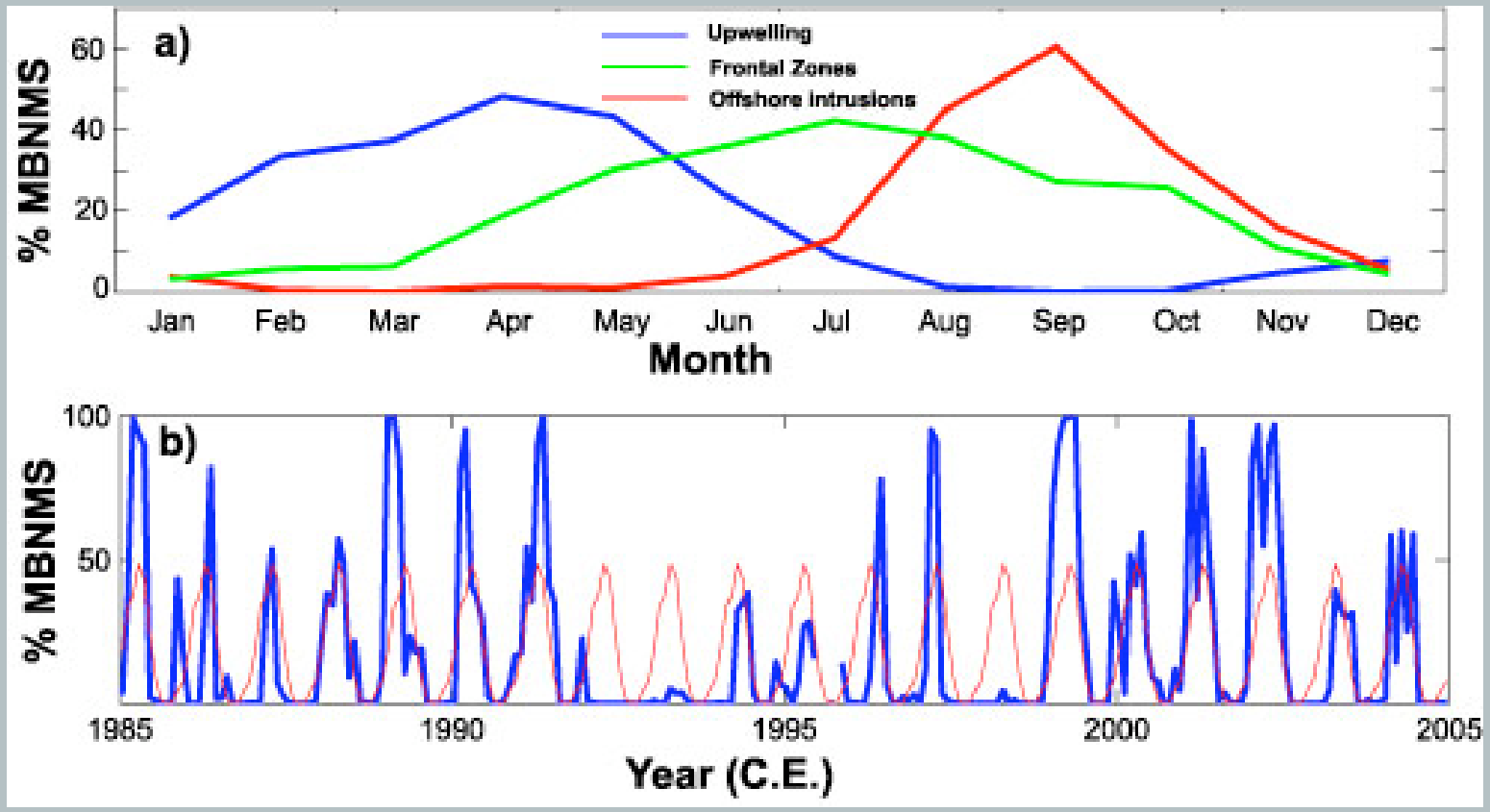


Marine Protected Areas (MPA)

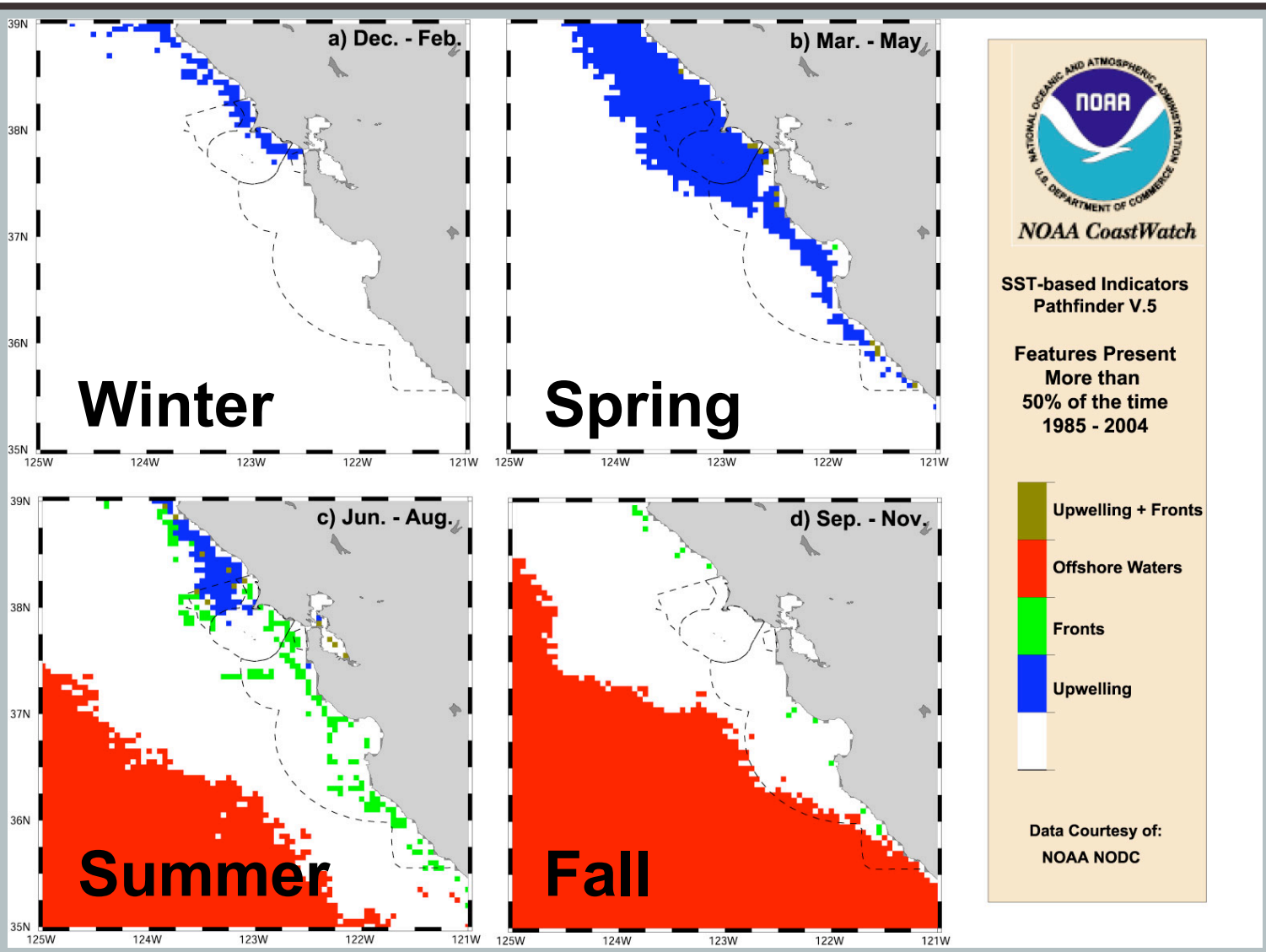
Upwelling: water with T < 12°C

Front: gradient > 0.05°C per km

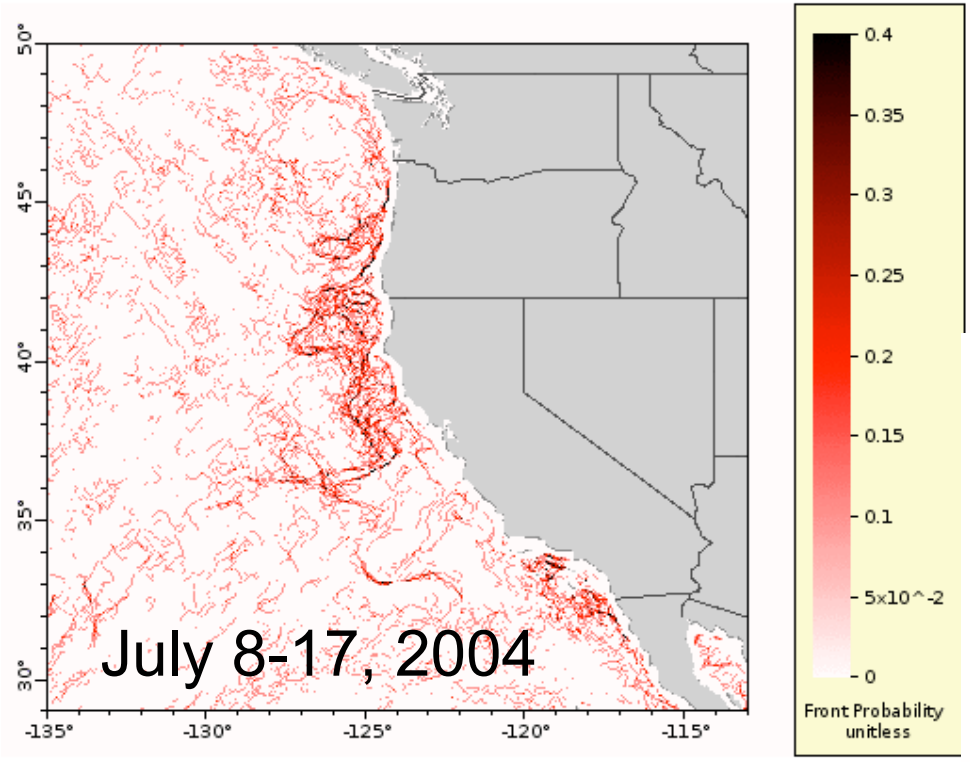
Offshore: water with T > 15°C

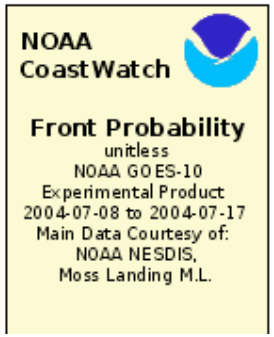


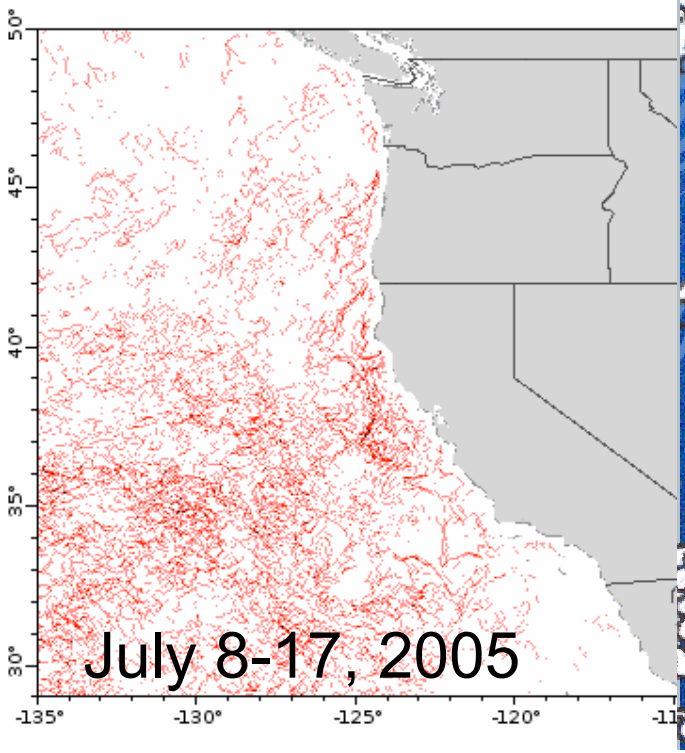
MPA Characterization



Front Probability







Maps from new browser,
Dataset courtesy of Chelton, CIOSS

Tagging of Pacific Pelagics

Live Access to TOPP Data

Species
Individuals
Times/Regions
Get Output

Output Options
Previous Output

About

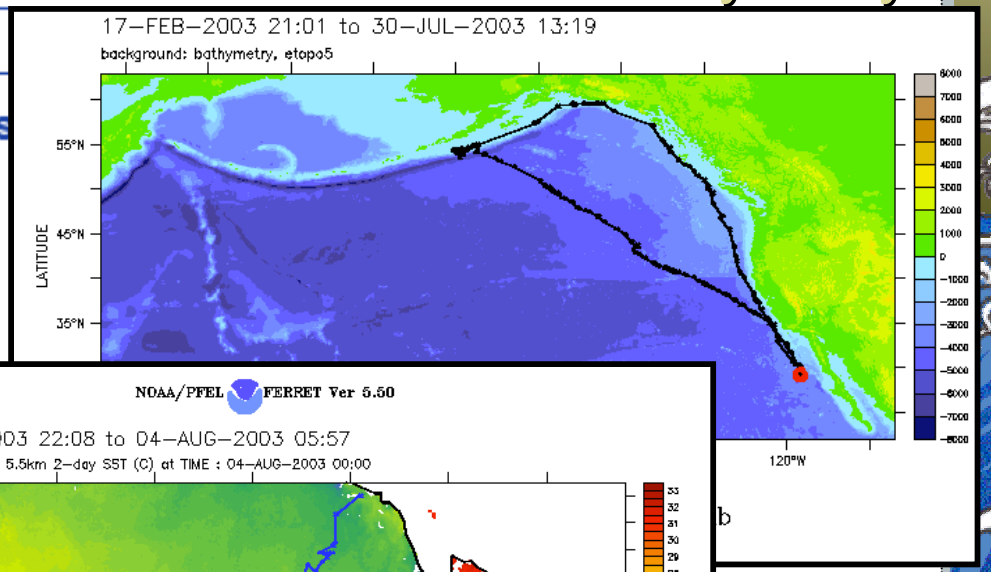
About TOPP
Instruments
About the Animals
Other Information
Disclaimers

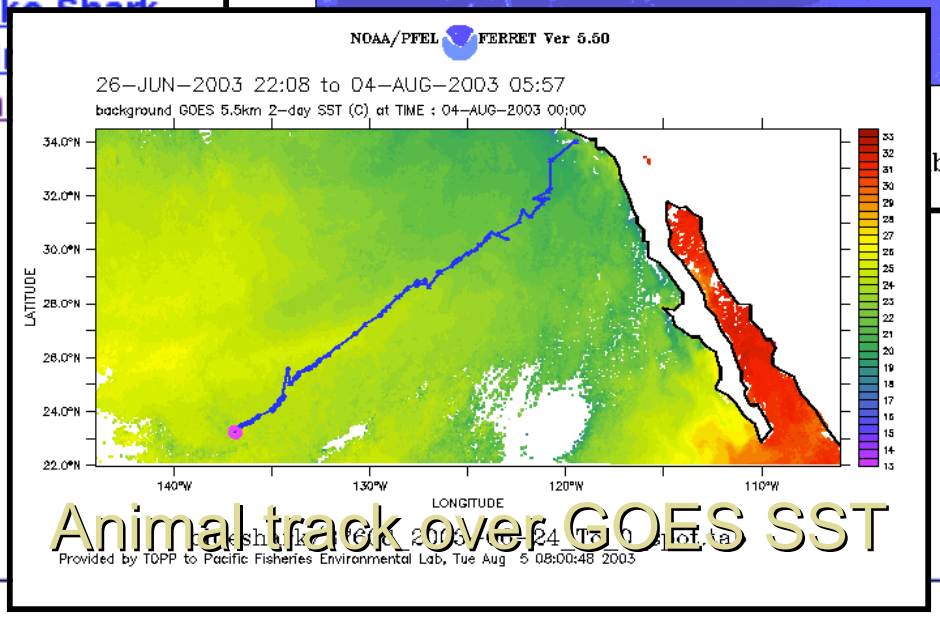
Datasets

Select species

Albatross
Blue Shark
Bluefin Tuna
Elephant Seal
Mako Shark
Sailfish
White Shark

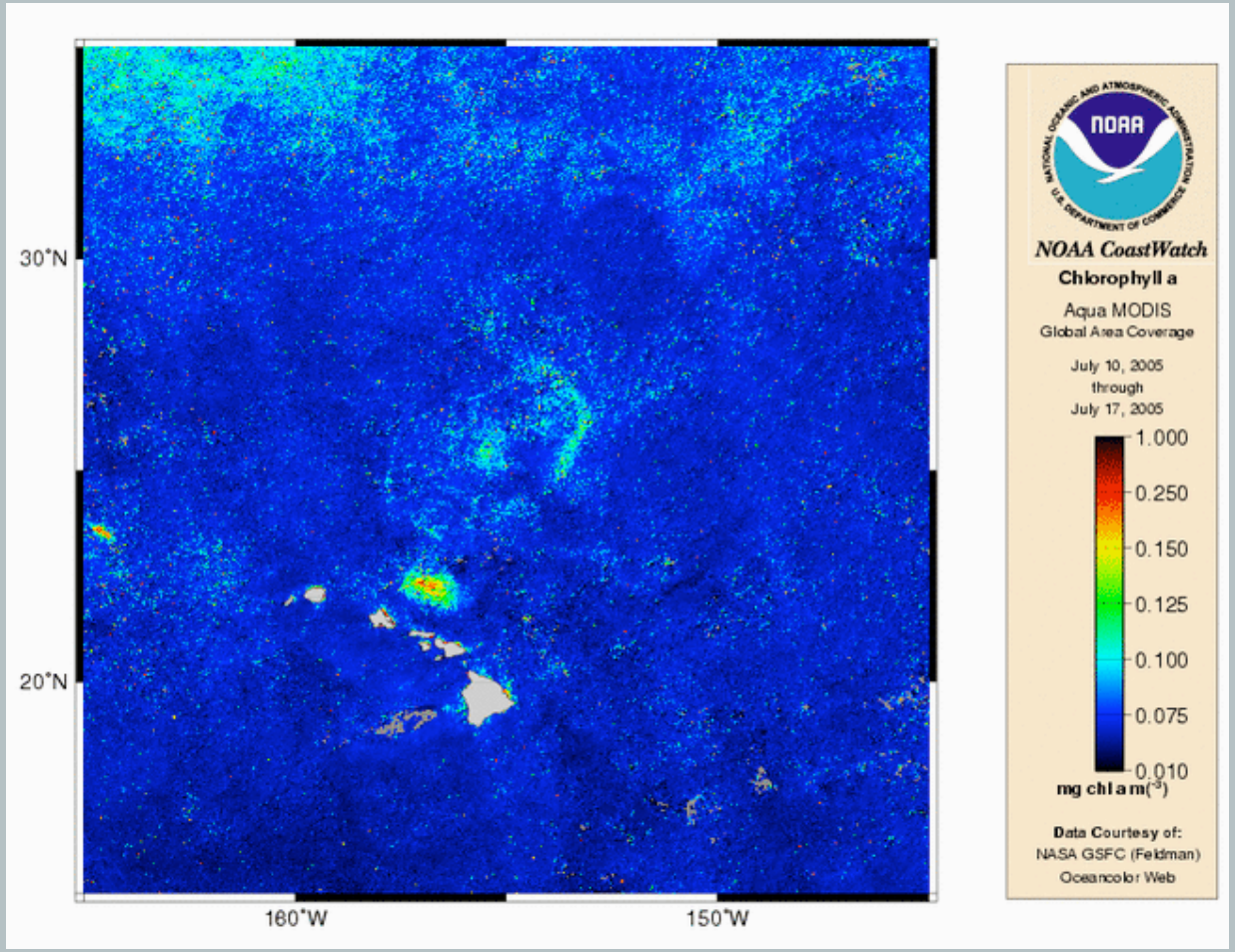
Animal track over bathymetry





Animal track over GOES SST

Bloom Watch

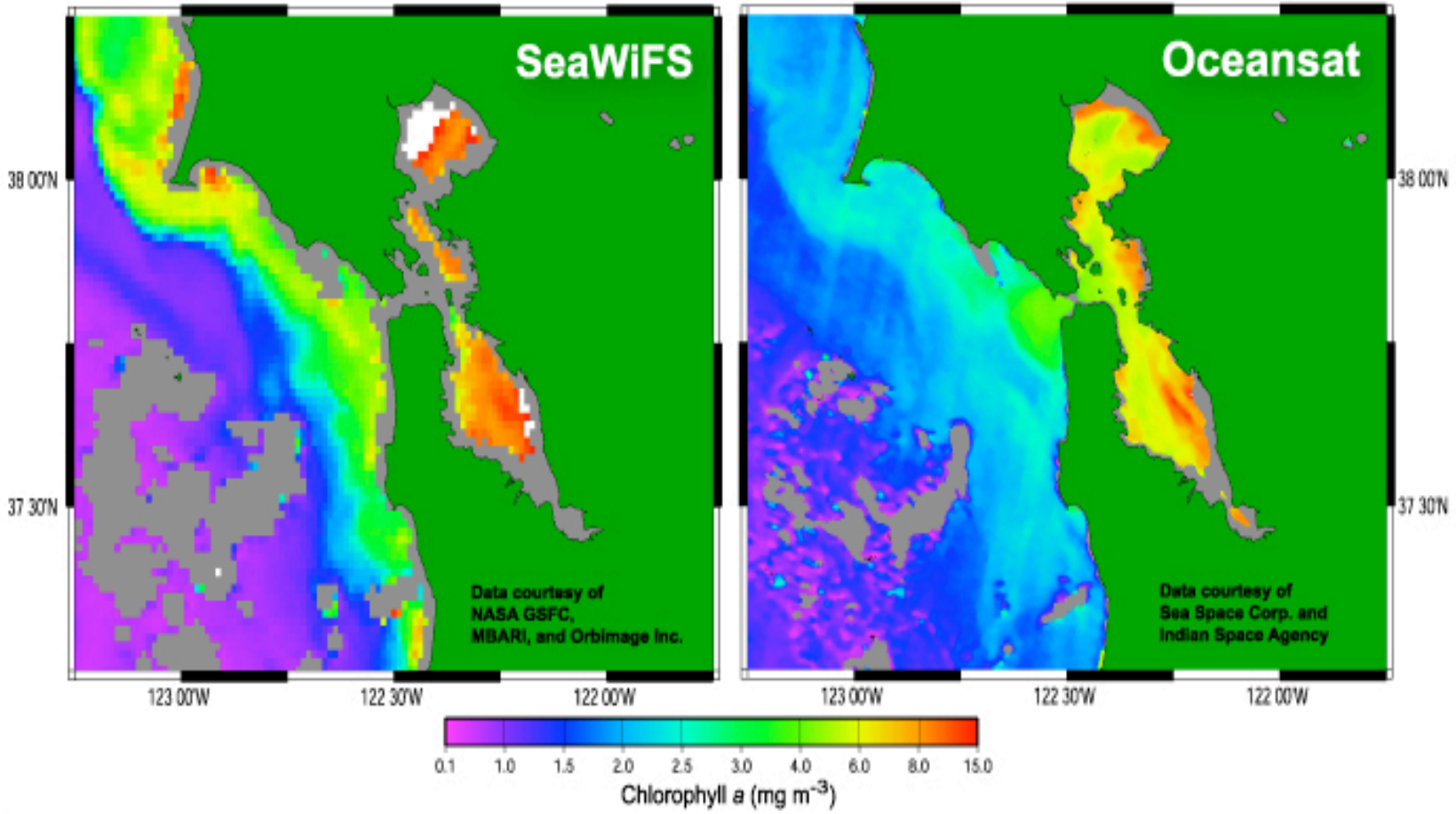


July 10-Sept 16, 2005

Cruise Support
(not a complete list…)

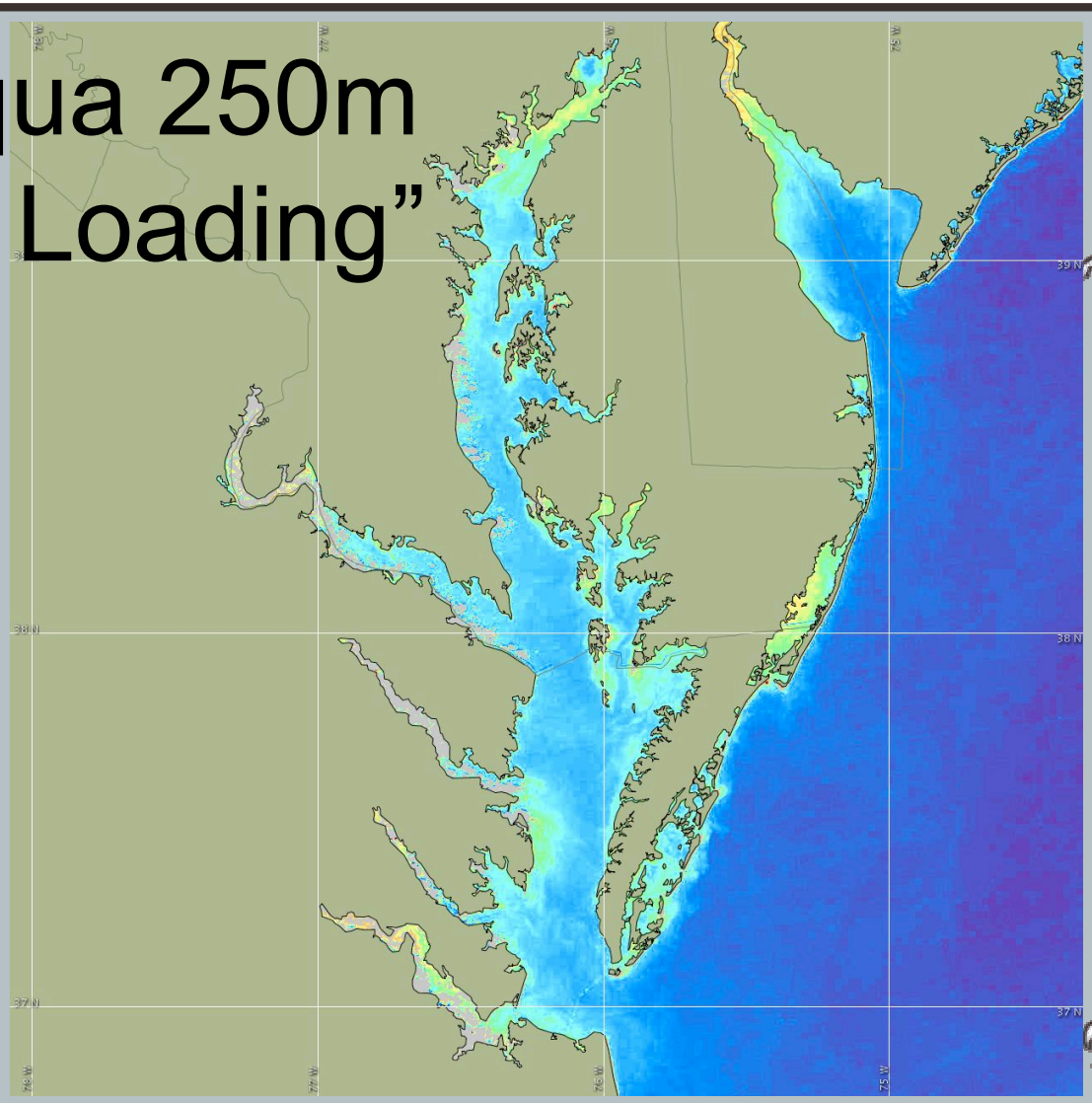
- **Peter Franks (Scripps)**
  HAB cruise in CA bight
- **Liz Clarke (NOAA/NMFS/NWFSC)**
  Groundfish survey & assessment
- **Cynthia Tynan (WHOI)**
  Hecata Bank suspected toxin poisoning survey
- **Rosenfeld, Murphree, Collins (NPS)**
  Quarterly teaching cruises
- **Rich Charter (NOAA/NMFS/SWFSC)**
  CALCOFI egg counting cruises for stock assessment
- **Barbara Block (Stanford/HML)**
  Semester-at-sea teaching program
- **Veerstra (Airborne Technologies Inc.) and NOAA**
  GhostNet aerial surveys of debris in the N. Pacific

Looking Forward…



Looking Forward…

MODIS Aqua 250m
“Sediment Loading”



Summary

- New & improved data delivery systems, designed to accommodate RA/IOOS requirements, and based on user feedback and requests:
  - » OceanWatch Live Access Server
  - » New CoastWatch Data Browser Tool
- Continued responsiveness to user needs through adding new products and supplying customized products in support of fishery-related research cruises
- To quote the admiral, “our people are our most valuable assets” – the phenomenal improvements to WCRN services wouldn’t have been possible without Dave Foley, Bob Simons and Luke Spence